

## CLAIMS

What is claimed is:

1. A vacuum cleaner comprising:

a housing defining a cyclonic airflow chamber for separating contaminants from a dirt-containing airstream, said housing further comprising a cyclonic chamber inlet and an airstream outlet in fluid communication with said cyclonic airflow chamber;

5 a nozzle housing including a suction opening, said suction opening being fluidly connected with said cyclonic chamber inlet;

an airstream suction source fluidly connected to said main suction opening and to the cyclonic airflow chamber for transporting dirt-containing air from the main suction opening to the cyclonic airflow chamber, said suction source is adapted to  
10 establish and maintain a dirt-containing airstream from said main suction opening to said cyclonic chamber inlet;

a dirt-collecting bin mounted beneath said cyclonic airflow chamber, the dirt-collecting bin comprising a bottom wall and a cylindrical sidewall;

a separator plate between the cyclonic airflow chamber and the dirt-  
15 collecting bin and separating the cyclonic airflow chamber from a dirt-collecting bin, the separator plate having a diameter less than a diameter of the cyclonic airflow chamber adjacent the separator plate to thereby define a gap between the separator plate and the cyclonic airflow chamber for passage of dirt separated from the dirt-containing airstream in the cyclonic airflow chamber whereby the passage of dirt through the gap is  
20 accompanied by airflow patterns having horizontal and vertical components between the gap at one side of the dirt-collecting bin and the bottom wall at an opposite side of the dirt-collecting bin, which airflow tends to entrain dirt particles therein; and

Airflow inhibitors in the dirt-collecting bin to reduce the vertical component of the elliptical airflow, thereby tending to agglomerate and separate the dirt particles from  
25 the elliptical airflow.

2. A vacuum cleaner according to claim 1 wherein the flow inhibitors comprise at least one prong extending upwardly from the bottom wall of the dirt-collecting bin and positioned radially between a center of the dirt-collecting bin and the sidewall thereof.

3. A vacuum cleaner according to claim 2 wherein the flow inhibitors comprise a plurality of said prongs each positioned radially between a center of the dirt-collecting bin and the sidewall thereof.

4. A vacuum cleaner according to claim 3 wherein the prongs extend a portion of the distance from the bottom wall and the separator plate.

5. A vacuum cleaner according to claim 3 wherein the prongs are rectangular in cross section.

6. A vacuum cleaner according to claim 5 wherein the prongs in cross-section have a long axis that is radially disposed in the dirt-collecting bin.

7. A vacuum cleaner according to claim 3 wherein the prongs are equal-angularly spaced about the bottom wall of the dirt-collecting bin.

8. A vacuum cleaner according to claim 3 wherein the airflow inhibitors further comprise at least one fin that extends radially inwardly from the sidewall of the dirt-collecting bin.

9. A vacuum cleaner according to claim 2 wherein the airflow inhibitors further comprise at least one fin that extends radially inwardly from the sidewall of the dirt-collecting bin.

10. A vacuum cleaner according to claim 9 wherein the airflow inhibitors comprise two and only two fins.

11. A vacuum cleaner according to claim 10 wherein the fins are generally positioned vertically below the inlet.

12. A vacuum cleaner according to claim 9 wherein the at least one fin is positioned vertically below the inlet.

13. A vacuum cleaner according to claim 12 wherein the at least one fin extends a portion of the distance between the bottom wall and the separator plate.

14. A vacuum cleaner according to claim 13 wherein the at least one fin extends between 40% and 60% of the distance between the bottom wall and the separator plate.

15. A vacuum cleaner according to claim 9 wherein the fins have a radial dimension between 2% and 10% of the radius of the dirt-collecting bin.

16. A vacuum cleaner according to claim 9 wherein the fins have a radial dimension between 3% and 6% of the radius of the dirt-collecting bin.

17. A vacuum cleaner according to claim 9 wherein the fins have a radial dimension equal to about 4% of the radius of the dirt-collecting bin.

18. A vacuum cleaner according to claim 1 wherein the flow inhibitors comprise at least one fin that extends radially inwardly from the sidewall of the dirt-collecting bin.

19. A vacuum cleaner according to claim 18 wherein the airflow inhibitors comprise two and only two fins.

20. A vacuum cleaner according to claim 19 wherein the fins are generally positioned vertically below the inlet.

21. A vacuum cleaner according to claim 19 wherein the fins extend a portion of the distance between the bottom wall and the separator plate.

22. A vacuum cleaner according to claim 19 wherein the fins have a radial dimension between 2% and 10% of the radius of the dirt-collecting bin.

23. A vacuum cleaner according to claim 22 wherein the fins have a radial dimension between 3% and 6% of the radius of the dirt-collecting bin.

24. A vacuum cleaner according to claim 23 wherein the fins have a radial dimension equal to about 4% of the radius of the dirt-collecting bin.

25. A vacuum cleaner according to claim 18 wherein the at least one fin is positioned generally below the inlet.

26. A vacuum cleaner according to claim 18 wherein the at least one fin extends a portion of the distance between the bottom wall and the separator plate.